

**ADDITIONAL POLYMORPHISM IN FEMALES OF
HYPOLIMNAS BOLINA PALLESCENS (BUTLER)
(LEPIDOPTERA: NYMPHALIDAE) FROM THE ISLANDS
OF TAVEUNI AND VANUA LEVU, FIJI**

R.B. LACHLAN

Entomology Department, Australian Museum, 6 College St, Sydney, NSW 2010

Abstract

Numerous additional polymorphic *Hypolimnas bolina pallescens* (Butler, 1874) female forms were collected on the central west coast of Taveuni during May 1982 and from a small area approximately 5 km southwest of Savusavu on the south central coast of Vanua Levu, Fiji, during November-December 2014. Their polymorphism is discussed and the morphs not previously collected on Viti Levu by the author are illustrated.

Introduction

In Fiji, *Hypolimnas bolina pallescens* (Butler) is the subspecies of *H. bolina* (L.) assigned to this region of the Pacific. Adults of *H. bolina* are sexually dimorphic but the females in Fiji, Samoa and Guam (the largest island in Micronesia, in the Western Pacific), in particular, display an extraordinary range of polymorphism apparently not seen to the same degree anywhere else across its very extensive range (Clark and Sheppard 1975).

The primary purpose of this paper is to illustrate additional female morphs not previously collected and illustrated (Lachlan 2014) from Fiji. Once again, all specimens collected on both islands were within small areas of forest and coconut plantations measuring just a few hectares in area.

Hypolimnas bolina pallescens adults are generally widespread and locally common in Fiji and can best be found along forest trails, clearings and roadsides where they usually fly close to the ground and often rest on low vegetation. The author has noted that, if disturbed, females will often fly for a short period and look for a resting place. Having collected and examined 244 females from three different islands in Fiji, it is clear that, while most morphs can be placed with reasonable accuracy into the four main forms given by Poulton (1924) to describe the four basic phenotypes, placing the large number of intermediate morphs the author has collected into the three additional intermediate forms given by Clark and Sheppard (1975) has proved, with many morphs, much more difficult and rather subjective at times. There are also a small number of uniquely coloured and patterned morphs that are difficult to place in any of the seven current groupings.

Surveys

The brief survey on the central west coast of the island of Taveuni (the third largest island in Fiji) was done from 11 to 20 May 1982. Being at the end of the wet season, most specimens collected showed signs of wear and no fresh specimens were taken. An intensive survey was also conducted near Savusavu on the south central coast of Vanua Levu, the second largest island

in Fiji, from 30 November to 13 December 2014. Unfortunately, most days were overcast with rain periods and only intermittent hours of sunshine. *H. b. pallescens* adults were commonly encountered not only along the forest trails but also in a nearby coconut plantation, where they flew close to the ground generally landing frequently. Good rains had fallen about two weeks prior to the commencement of the survey and most specimens collected and observed showed wear and wing damage, indicating they had been on the wing for some time. As further rain fell regularly during the survey period more fresh specimens appeared. Numerous morphs not taken by the author earlier in 2014 on Viti Levu were collected. Vanua Levu is approximately 63 km NE of Viti Levu (the main island in Fiji) while Taveuni is just 8 km SE of the eastern side of Vanua Levu.

***Hypolimnas bolina pallescens* (Butler, 1874)**
(Figs 1-22)

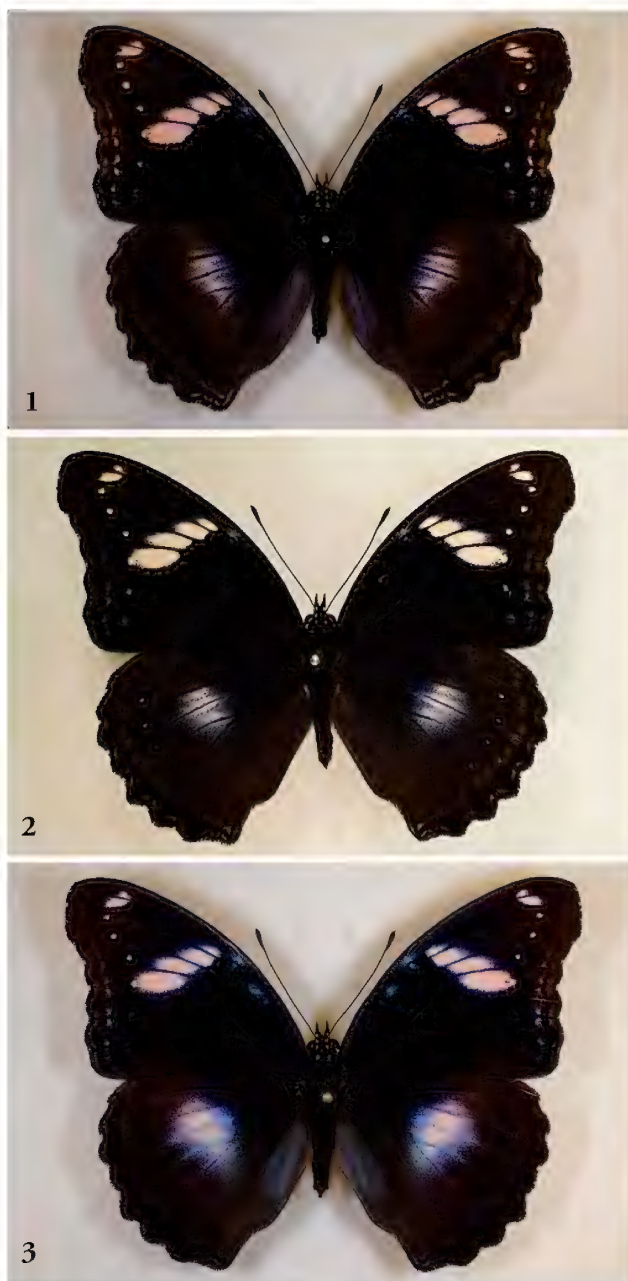
Material examined. Taveuni survey: 14 ♂♂, 25 ♀♀, FIJI: Central west coast of Taveuni Island, between 11-20.v.1982, R.B. Lachlan. (All in RBL collection).
Vanua Levu survey: 4 ♂♂, 112 ♀♀, FIJI: 5 km SW of Savusavu, south central coast of Vanua Levu, 16°48'58"S, 179°17'20"E, between 30.xi.-13.xii.2014, R.B. Lachlan. (All in RBL collection).

The various female forms collected during both surveys and their numbers are recorded in Table 1. As the Taveuni survey was brief and done over 30 years ago, an accurate comparative analysis of any differences between the two islands is not worthwhile, other than to note that no morphs of the forms *euploeoides-pallescens* or *pallescens* were collected on Taveuni.

Specimen sizes. All measurements are set wingspans. The largest from Taveuni was 82 mm, the smallest was 68 mm and the average (n = 25) was 73.4 mm. The largest from Vanua Levu was 83 mm (this is very large for the species) and the smallest was 61 mm.

Table 1. Results for *Hypolimnas bolina pallescens* females from Taveuni and Savusavu, Vanua Levu.

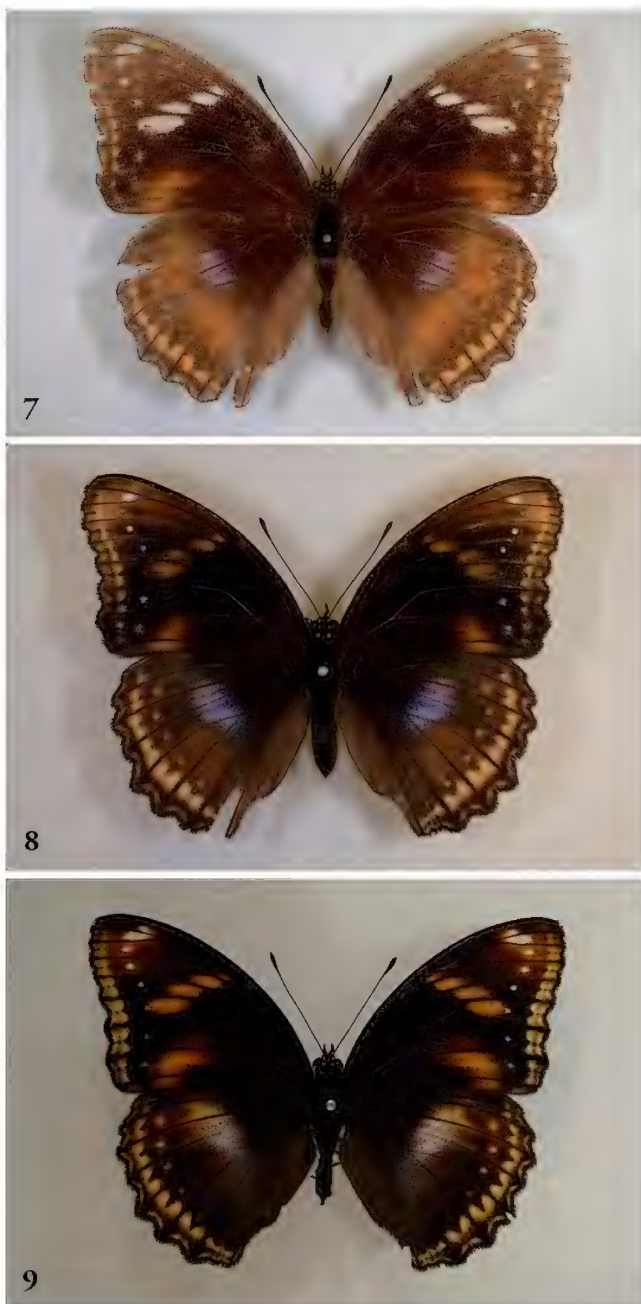
Form	Numbers collected / %	
	Taveuni	Savusavu, Vanua Levu
<i>euploeoides</i>	6 / 24	28 / 25
<i>euploeoides-naresi</i>	6 / 24	10 / 9
<i>naresi</i>	3 / 12	15 / 13.3
<i>euploeoides-nerina</i>	3 / 12	43 / 38.4
<i>nerina</i>	7 / 28	6 / 5.3
<i>euploeoides-pallescens</i>	0 / 0	1 / 0.8
<i>pallescens</i>	0 / 0	9 / 8



Figs 1-3. Females of *Hypolimnastolinas bolina* from Fiji: f. *naresi*.



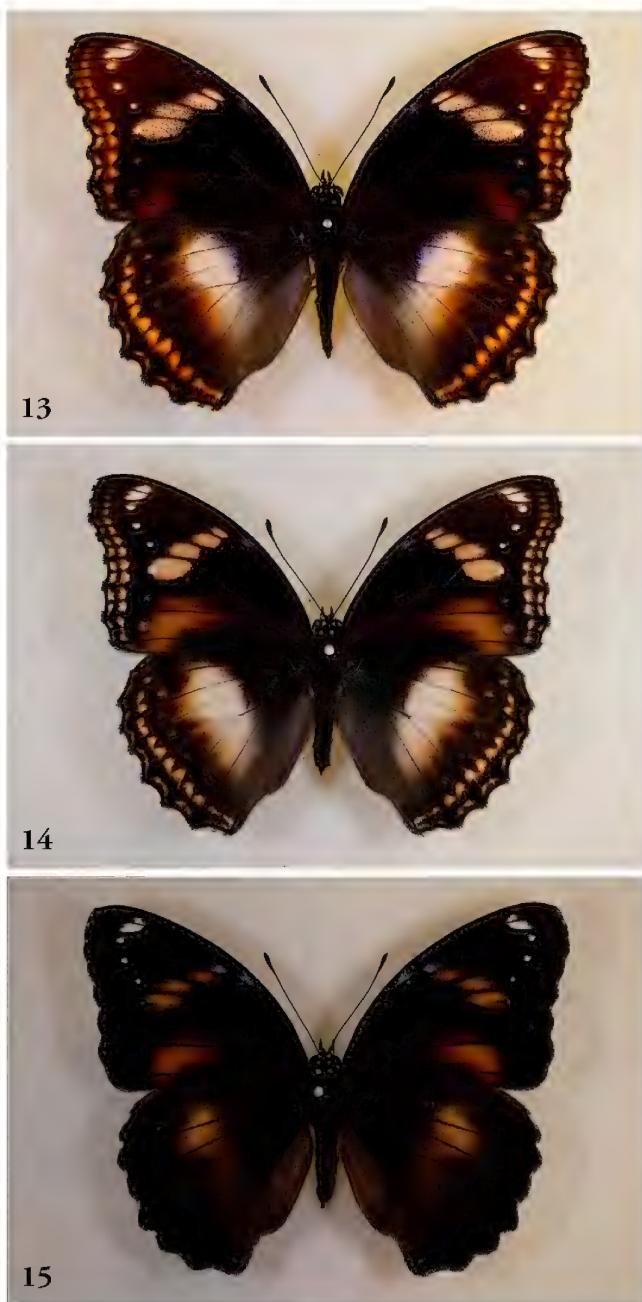
Figs 4-6. Females of *Hypolimnast bolina* from Fiji: f. *euploeoides-nerina*.



Figs 7-9. Females of *Hypolimnast bolina* from Fiji: f. *euploeoides-nerina*.



Figs 10-12. Females of *Hypolimnast bolina* from Fiji: f. *euploeoides-nerina*.



Figs 13-15. Females of *Hypolimnast bolina* from Fiji: f. *euploeoides-nerina*.



Figs 16-18. Females of *Hypolimnias bolina* from Fiji: (16-17) f. *euploeoides-nerina*; (18) f. *euploeoides-pallescentis*.



Figs 19-21. Females of *Hypolimnast bolina* from Fiji: f. *pallascens*.



Fig 22. Female of *Hypolimnas bolina* from Fiji: f. *pallescens*.

Discussion

Having now examined 244 female *H. b. pallescens* adults as a result of field work conducted in Fiji over a number of years, it has become increasingly obvious to the author that they display such an astonishing degree of polymorphism that it was described by Vane-Wright *et al.* (1977) as being quasi-continuous – without ceasing. Given that in many parts of the Pacific this is the case, relying on changes in individual wing patterns and colours to describe subspecies or particular forms is not possible as there are so many intermediates between the four basic phenotypes. Vane-Wright and Tennent (2011) correctly noted that, in the case of *Junonia villida* (Fabricius), ‘systematists working from short series collected during rare visits to remote islands could be misled into thinking that they were dealing with stable, locally adapted subpopulations worthy of subspecific status.’ The same must also be said for the past use of form names that have been applied to various *H. bolina* females.

Acknowledgements

I am grateful to John Tennent (Natural History Museum, London) for providing important reference material. I would also like to thank Russel Cox (Entomology Department, Australian Museum, Sydney) for his help in producing the digital images used in the plates.

References

CLARK, C.[A.] and SHEPPARD, P.M. 1975. The genetics of the mimetic butterfly *Hypolimnas bolina* (L.). *Philosophical Transactions of the Royal Society of London, Series B* **272**: 229-265.

LACHLAN, R.B. 2014. Extreme polymorphism in *Hypolimnias bolina* (Linnaeus) (Lepidoptera: Nymphalidae) females from a single locality on the southwestern coral coast of Viti Levu, Fiji. *Australian Entomologist* **41**(4): 233-263.

POULTON, E.B. 1924. Mimicry in the butterflies of Fiji considered in relation to the Euploeine and Danaine invasions of Polynesia and to the female forms of *Hypolimnias bolina* L. in the Pacific (with an appendix on the numerical aspect of reciprocal mimicry (diaposematic resemblance) by H.H. Turner). *Transactions of the Entomological Society of London* **1923**: 564-691, 23 pls.

VANE-WRIGHT, R.I. and TENNENT, W.J. 2011. Colour and size variation in *Junonia villida* (Lepidoptera, Nymphalidae): subspecies or phenotypic plasticity? *Systematics and Biodiversity* **9**(4): 289-305.

VANE-WRIGHT, R.I., ACKERY, P.R. and SMILES, R.L. 1977. The polymorphism, mimicry, and host plant relationships of *Hypolimnias* butterflies. *Biological Journal of the Linnean Society* **9**: 285-297.